

J Gardner¹, CY Ackland¹, AJ Munro¹, IW Sanders¹, AM Thompson², JS Vaidya², DC Brown², MM Reis², SJ Cole³, L Walton³, S Chalmers⁴, DA Wilton⁴, DB Kellock⁴, CA Purdie⁵, LB Jordan⁵, K Armoogum⁶, CD Mackay⁶

Departments of Oncology¹, Surgery², Anaesthetics³ Tissue Bank⁴, Pathology⁵, Medical Physics⁶
Ninewells Hospital and Medical School, Dundee DD1 9SY

Background

Despite mortality rates of breast cancer falling for the last decade, it remains the second most common cause of death among women between the ages of 45-65. Historically the treatment of choice for breast cancer has been radical mastectomy, however with randomised trials carried out over the last forty years, breast conserving surgery (wide local excision and nodal sampling) has been shown to be as effective.

Following a wide local excision of the tumour, radiotherapy is known to reduce the risk of local occurrence by approximately two thirds, and traditionally external beam radiotherapy (EBRT) has been given to the whole breast.

Since 2004, Ninewells Hospital and Medical School have developed an intra operative radiotherapy (IORT) programme using the Intrabeam™ system. With this technique the tumour bed is wrapped around or conformed to the radiotherapy source, delivering a targeted radiotherapy boost within the breast, given at the time of the primary surgery.

Given this background and limited knowledge of the biology of normal breast tissue response to radiotherapy, there is a clinical opportunity to explore the effects of local radiotherapy on normal breast tissue in patients undergoing breast conserving surgery.

Challenges and opportunities

The majority of patients with breast cancer who are treated with IORT are entered into a randomised trial (TARGIT – www.targittrial.org). The introduction of novel technologies into routine clinical practice presents both challenges and opportunities. One of the opportunities allows us to exploit the ability, provided by the IORT project, to obtain biopsies from tissue at and around the time of radiation treatment to provide a better understanding of the molecular response to radiation in normal tissue.



Within this study we aim to examine timed normal breast tissue, venous blood and buccal mucosa. Quality control is a key issue: we have to ensure that our sampling and our processing procedures are rigorously controlled and reproducible on a day to day basis. The time from the sample being taken to the time it is stored and transferred to the tissue bank is four minutes. This, in the context of a routine operating list presents many practical challenges. Effective communication within the multi-professional team is essential for the smooth initiation of this translational research study into the existing constraints of a busy NHS teaching hospital service.

In the development of the necessary infrastructure we needed to put the following in place:-

- education of the multi-professional team
- effective communication
- development of a cohesive team
- protocols
- equipment
- trial runs
- quality assurance
- promotion of ethos of research
- personal professional development

This study was started in March 2006, and to date we have obtained samples from twelve patients. Quality Assurance by Pathology is ongoing

Further Reading:

Baumann M. et al. *The Translational Research Chain: is it delivering the goods?* (2001). *Int. J. Radiation Oncology Biol. Phys.*, Vol 49, No 2, pp 345 – 351

Vaidya JS. et al. *Targeted intra-operative radiotherapy (TARGIT): an innovative method of treatment for early breast cancer.* *Ann Oncol* (2001); 12(8): pp 1075-1080

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Contact details: June Gardner email JXGardner@dundee.ac.uk

Caroline Ackland email c.ackland@dundee.ac.uk